Geographic Location and Accounting Choices: Evidence from Managers' Earnings Management Decisions

Abstract

This study investigates the relation between firm geographic location, i.e., urban vs. rural, and managers' earnings management choices. Adopting multiple definitions of urban and rural firms, we consistently find that compared to rural firms, urban firms are less likely to use production-related real earnings management while more likely to use accrual earnings. In addition, we find that firms' urban location reduces the positive impact of both firm complexity and Sarbanes-Oxley (SOX) on managers' decisions of using real earnings management. Overall, this study suggests that urban firm managers reduce the use of value-destroying real earnings management because (1) investors possess greater familiarity towards urban firms, and (2) more investors are readily accessible to urban firms' soft information. In additional tests, we focus on a subsample of earnings management suspect firms and find that managers' tradeoff decision of these two earnings management strategies is conditional on firms' geographic locations.

Keywords: Geographic locations; earnings management; accrual earnings management; real earnings management; firm complexity; Sarbanes-Oxley (SOX).

Data availability: Data are available from sources identified in the paper.

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I. Introduction

Prior literature finds that managers influence financial performance measures through either alternating firm's operational activities or using accruals to manipulate earnings (Cohen, Dey, and Lys 2008; Cohen and Zarowin 2008; Zang 2012). Recent studies posit that firms' geographic locations have a significant impact on the cost of obtaining information and the effectiveness of external monitoring, which affect the firms' liquidity, information dissemination, and corporate payout policies (Loughran and Schultz 2005; Loughran 2007; John, Knyazeva, and Knyazeva 2011). We extend this line of research by investigating the relation between firms' geographic locations and managers' earnings management decisions. We provide evidence that firms' locations exert an economically significant impact on managers' earnings management decisions, incremental to the determinants addressed in the existing studies.

In general, managers can manage earnings through operational (real earnings management or REM) and accrual accounting decisions (accrual earnings management or AEM). Although both are costly, REM and AEM are fundamentally different and have distinct impacts on firm performance. REM is managers' purposeful operational practice to alter reported earnings in a particular direction by deviating firms' operational activities from their optimal levels (Roychowdhury 2006). Prior studies show that REM is value-destroying and has a suboptimal consequence on future firm performance (Bhojraj, Hribar, Picconi, and McInnis 2009; Cohen and Zarowin 2010). In addition, REM leads to higher tax costs in the current period as it affects firms' current and future cash flows (Zang 2012). As such, institutional investors and outside stakeholders pay close attention to firms' REM activities (Roychowdhury 2006; Zang 2012). Examples of REM include overproduction, which leads to lower cost of goods sold (COGS) and/or the reduction of selling, general and administrative expenses (SG&A), advertising expenses, and research and development expenses (R&D), which leads to higher gross margin.

In contrast, AEM changes the reporting methods or estimates used for a given transaction in the financial reporting while keeping operational practice unchanged. Examples of AEM include changing the estimate of provision for bad debt expense and the depreciation method for fixed assets. Although managers have the flexibility to make judgments and estimates under accrual accounting, they must follow the guidelines enforced by the regulators and auditors. In addition, due to the reversing nature of accrual accounting, managers' biased judgments and estimates in one period reduce their ability to make similar judgments and estimates in the subsequent periods. Given the articulation between the income statement and the balance sheet, any accruals included in earnings are also reflected in net assets. Thus, the extent to which earnings can be biased up through accruals decreases with the extent to which net assets are already overstated. Collectively, AEM is constrained by the scrutiny from regulators and auditors as well as the accounting flexibility within firms' financial reporting systems.

Prior literature shows that firms' geographic locations affect firms' information environment and liquidity. Investors exhibit a strong preference for locally headquartered firms (Coval and Moskowitz 1999; Grinblatt and Keloharju 2001; Huberman 2001; Ivkovic and Weisbenner 2005) and tend to earn substantially higher returns in local stocks (Coval and Moskowitz 2001; Hau 2001). Studies also show that the superiority of local stock returns occurs because their proximity provides investors with an information advantage (Coval and Moskowitz 1999&2001; Ivkovic and Weisbenner 2005; Malloy 2005). Along with this line, Loughran and Schultz (2005) argue that urban stocks are more likely to be local stocks because urban firms have a greater investor base. Moreover, they show that urban firms are associated with higher trading volume, more analyst following, and higher institutional ownership. Loughran (2007) further suggests that urban firms have an information advantage over rural firms because informal information (i.e., soft information) is more easily accessible to people physically nearby. In summary, urban firms have greater investor familiarity, resulting in lower information asymmetry (Urcan 2007; Loughran 2007&2008; Baik, Kang, and Kim 2010) and higher monitoring effectiveness (Ayres, Ramalingegowda, and Teung 2011; Kedia and Rajgopal 2011; John et al. 2011).

We extend previous studies by investigating the relation between geographic location and accounting-related outcomes. Whether firms' locations (urban vs. rural) influence managers' earnings management decisions is an important research question for two reasons. First, as pointed out in Dyreng, Hanlon, and Maydew (2012), prior research on earnings management has focused on *how*, *why*, and *when* managers manage earnings, but very few studies have explored *where* firms manage earnings. Their study is the first trying to fill up the gap by documenting that earnings management is most likely to take place in domestic income rather than foreign income. Our study addresses this research question by further investigating whether *how* managers manage earnings (REM vs. AEM) is conditional on *where* the firm is located (urban vs. rural). Second, prior literature shows that the tradeoff decisions between REM and AEM are driven by their relative costs. With recent interests of the impact of soft information on firms' liquidity and various financial policies (Bertomeu and Marinovic 2016; Liberti and Petersen 2018), we expect that firms' geographic locations affect management earnings management choice, i.e., REM vs. AEM., through changing firms' information asymmetry and monitoring effectiveness.

Following prior studies (Coval and Moskowitz 1999; Zhu 2002; Ivkovic and Weisbenner 2005; Malloy 2005; Loughran and Schultz 2005; John et al. 2011), we use Compustat data on firms' headquarters locations to classify each firm as urban or rural. Following Loughran and Schultz (2005) and John et al. (2011), we define a firm as an urban firm if its headquarters is in one of the ten largest metropolitan areas in the United States, i.e., New York City, Los Angeles, Chicago, Washington, San Francisco, Boston, Dallas-Fort Worth, Philadelphia, Houston, Miami, and their suburbs, based on the 2010 Census[1]. We measure geographic location with metro statistical area (*Urban*), which is equal to one if a firm is located in one of these ten metropolitan areas, and zero otherwise. We measure earnings management with accrual earnings management (AEM) and real earnings management (REM). We follow Kothari, Leone, and Wasley (2005) to measure AEM using performance-matched discretionary

[1] In addition, we adopt two alternative proxies to classify urban and rural firms: (1) the distance to major airports, and (2) the number of top 100 cities within 100-mile radius.

accruals, and Roychowdhury (2006) and Kothari, Mizik, and Roychowdhury (2016) to measure REM with abnormal production costs and abnormal discretionary expenses. Following Zang (2012), we further combine these two proxies of REM to an aggregate REM measure because some firms engage in both.

Employing a large generalizable sample of firm-years between 1996 and 2013, we find that, urban firms have a lower aggregate REM attributable to lower overproduction, and higher discretionary accruals when compared to rural firms. This evidence suggests that the lower information asymmetry and better governance in the urban firms help reduce managers' use of the value-destroying REM. We further investigate whether the association between firms' complexity and managers' earnings management decisions varies with firms' geographic locations. Bushman, Chen, Engel, and Smith (2004) posit that complex firms should be associated with higher REM. However, we find while such positive association exists in rural firms, it is reversed in urban firms, consistent with the argument that easy access to informal information overcomes the difficulty of monitoring and thus reduces value-destring REM. Lastly, we explore whether the influence of the passage of Sarbanes-Oxley (SOX) on managers' earnings management varies across urban firms and rural firms. Consistent with Cohen, Dey, and Lys (2008), we find that firms, on average, engage in more REM after the passage of SOX. However, the post-SOX increase in REM is only attributable to rural firms, as urban firms experience a significant reduction in REM after the passage of SOX.

We conduct several supplemental analyses to corroborate our main analyses. First, following Cohen and Zarowin (2010) and Zang (2012), we test management tradeoff decision between REM and AEM using a subsample of earnings management suspect firms. To alleviate concerns of the selection bias in the suspect subsample, we adopt a Heckman (1979) two-stage procedure. This result echoes our baseline results. Second, following Loughran and Schultz (2005), Loughran (2008), and John et al. (2011), we adopt two alternative proxies to classify urban and rural firms: (1) the distance to major airports, and (2) the number of top 100 cities within a 100-mile radius. The results are unchanged using these two alternative proxies. Third, by considering the possibility that managers determine REM and

AEM simultaneously, we implement a simultaneous equation model to allow the endogenous correlation of these two earnings management activities. The results are consistent with our main findings.

In summary, this study suggests that urban firms' managers tend to use less REM and more AEM than rural firms' managers. Furthermore, complexity increases REM in rural firms, but the incremental effect is mitigated in urban firms. Lastly, we find that managers' choice of using more REM after the passage of SOX addressed in previous studies is driven mainly by rural firms. Our study offers several contributions. First, we complement the literature on earnings management. We provide evidence showing that the significant effect of geographic location on managers' earnings management decisions is incremental to a battery of broader corporate characteristics and accounting determinants identified in the existing studies. Second, Dyreng et al. (2012) take the first step to explore *where* firms manage earnings using multinational firms. Our study makes an incremental contribution to this stream of research by showing *where* firms are located affects *how* they manage earnings. Although decades of research has focused on *how*, *why,* and *when* firms manage earnings, very few studies have explored whether these questions are conditional on *where* firms are located. To the best of our knowledge, our study is the first that combines these two streams of research. Third, our study extends the geographic location literature to accounting. Recent studies provide evidence that firms' geographic location influences firms' liquidity, information dissemination, and corporate payout policy. Our study adds to this literature by showing that firms' geographic location is also related to managers' accounting decisions, such as managers' earnings management decisions. Fourth, prior literature suggests that managers of firms with more volatile operating environment and organizational complexity have a greater scope of moral hazard (Demsetz and Lehn 1985; Bushman, Chen, Engel, and Smith 2004). We extend this literature by showing the influence of complexity on moral hazard is conditional on firms' geographic location.

The remainder of this study proceeds as follows. In section 2, we review the prior relevant literature and develop the hypotheses. Section 3 describes the research design, including measurements of geographic location, REM, and AEM. In section 4, we report sample selection and descriptive statistics.

Section 5 discusses the main results, and section 6 presents the additional tests. The last section concludes and discusses the implication of our results.

II. Literature Review and Hypotheses Development

2.1 Geographic Location and Firm Financial Decisions

There is a growing interest in the recent literature examining the effects of geographic location on firm financial decisions. Early research in this field documents that investors have a strong preference for locally-headquartered firms. It is well established that investors prefer domestic firms over foreign firms, and among domestic firms, investors prefer firms that are located nearby. For example, Coval and Moskowitz (1999) find that one out of ten companies in investment managers' portfolio is located in the same city as the investment manager. Individual investors are even more biased toward locally-headquartered companies. As shown in Ivkovic and Weisbenner (2005), individual investors invest 31% of their portfolio in local stocks.

The prior literature documents two reasons for investors' bias toward local firms. The first reason emphasizes investors' greater familiarity towards local firms (Grinblatt and Keloharju 2001; Huberman 2001). Using a sample of Finnish firms, Grinblatt and Keloharju (2001) show that the familiarity is due to close proximity, the same language, and the same culture. Furthermore, this familiarity matters more to individual investors and less-informed institutional investors. Huberman (2001) speculates that just as people root for their home team, investors are more comfortable to invest in the business that is visible to them. Second, investors have an information advantage on local firms. Coval and Moskowits (2001) find that the abnormal returns earned in nearby firms are attributable to fund managers' information advantage over local stocks. Hau (2001) documents similar evidence using a sample of professional traders. He shows that professional traders' superior trading performance does not come from the location in the financial center or the affiliation with a large financial institution but from geographical proximity to the corporate headquarters. In addition to the fund managers and professional traders, individual investors also have an advantage in obtaining information of local investments. For instance, Ivkovic and

Weisbenner (2005) find that the average individual investor earns 3.2% higher annual return from local investments than nonlocal investments. Similar to investors, analysts express the same preference to local stocks. For example, O'Brien and Tan (2015) show that analysts are 80% more likely to cover local firms than nonlocal ones. Malloy (2005) and Jennings, Lee, and Matsumoto (2017) posit that geographically-proximate analysts possess information advantage, which leads to more accurate forecasts. In sum, numerous studies document that familiarity and easy access to information lead to investors' and analysts' bias toward local firms.

Loughran and Schultz (2005) further extend the difference between local and nonlocal firms to the dissimilarity between urban and rural firms. They argue that urban firms are more likely to be local firms while rural firms are more likely to be nonlocal firms. First, because urban firms are located near more sophisticated money managers and a greater individual investor base than rural firms, urban firms are more likely to be familiar to more investors. Second, investors have difficulty accessing the informal information of firms located in remote areas. As a result, rural firms are covered by fewer analysts, owned by fewer institutions, traded much less by investors, and have higher trading costs. These findings add to our understanding that the geographic location of the firm, urban vs. rural, affects its liquidity. Loughran (2007) further suggests that the differences between urban and rural firms lead information to be spread from urban firms to rural firms. One of the key contributions of this paper is to point out the role of the informal ways in which information is discovered and diffused: through the conversations with employees or customers, the local media coverage, and the sophisticated investors. Therefore, it is easier and cheaper to obtain information from urban firms.

2.2 Management Earnings Management

Managerial compensation incentives, borrowing cost, and equity offering provide managers with incentives to manipulate reported earnings (e.g., Dechow and Skinner 2000; Dichev and Skinner 2002; Cheng and Warfield 2005). Managers influence financial performance measures through accrual and accounting decisions (AEM) and through operational activities (REM).

AEM is achieved through changing reporting methods and estimates in order to alter reported earnings in a particular direction. The difference between net income and cash flows is referred to as accruals, which can be categorized into discretionary and non-discretionary components. Non-discretionary accruals result naturally from business conditions such as accounting timing difference, rather than from managers' manipulation of earnings. In general, non-discretionary accruals are not of major concern to earnings quality (Healy 1985; DeAngelo 1986). However, discretionary accruals are the accrual component chosen by managers to adjust a firm's cash flows and manipulate its earnings within the flexibility of accounting rules (Dechow 1994). Due to their discretionary nature, discretionary accruals are of concern on firms' earnings quality. Examples of discretionary accruals include increasing or decreasing estimates of bad debt reserves, warranty costs, and inventory write-downs. Given the reversing nature of the accruals, AEM borrows earnings from future periods to improve current earnings. As a result, this method of earnings management has high detection risk and one-to-one cost of earnings reduction in future periods.

REM is defined as management's operational activities to increase current period earnings, which is achieved by overproducing inventory to lower the cost of goods sold (COGS) or cutting discretionary expenditures (i.e., advertising expenditures, R&D expenditures, SG&A expenditures) to improve reported earnings. In other words, REM is management's intentional action that deviates from normal business practices and has suboptimal business consequences. According to Cohen, Dey, and Lys (2008), there has been an increase in the use of REM since the passage of SOX in 2002. REM is found by numerous studies to be value-destroying. For example, Roychowdhury (2006, p338) suggests that REM has a negative effect on a firm's performance by stating that "real activities manipulation can reduce firm value because actions taken in the current period to increase earnings can have a negative effect on cash flows in future periods." Cohen and Zarowin (2010) examine the relationship between REM activities of Seasoned Equity Offerings (SEO) firms and post-SEO firm performance and find that the decline in post-SEO operating performance is largely due to REM activities. Eldenburg, Gunny, Hee, and Soderstrom

(2011) find that the use of REM in nonprofit hospitals is associated with negative future performance. In addition, Abernathy, Beyer, and Rapley (2014) also argue that the use of REM may hurt a firm's future performance. For example, if managers cut R&D expenditures to increase the current year's earnings, the future performance may be hurt due to the lost opportunities from reduced R&D activities. Taken together, the formerly mentioned studies suggest a negative impact of REM on future firm performance.[2]

AEM changes the reported earnings by choosing the accounting methods or estimates without changing the underlying transactions, while REM changes the reported earnings by manipulating firms' operating activities. Both AEM and REM are costly activities, and managers make tradeoff decisions between these two manipulation methods based on their relative costs and constraints. Consistent with the survey study by Graham, Harvey, and Rajgopal (2005), Cohen at al. (2008) document that firms switch from AEM to REM to manage reported earnings after the passage of SOX in 2002 because REM has lower detection risk. Furthermore, Cohen and Zarowin (2010) examine how firms tradeoff AEM and REM around seasoned equity offering (SEO) and find that the negative impact of REM on post-SEO performance is more severe than AEM. Zang (2012) shows that firms substitute AEM for REM, or vice versa, depending on the relative costs of each earnings management strategy. She further documents that managers adjust the level of AEM according to the level of REM realized. Overall, the prior literature shows that AEM and REM are two common methods firms use to manage earnings and that these methods have different costs and constraints. Therefore, managers substitute AEM for REM, or vice versa, to manage earnings under different circumstances.

2.3 Hypotheses Development

2.3.1 Main Hypothesis

Extant research on earnings management focuses on *how*, *why*, and *when* managers manage earnings (e.g. Dyreng et al., 2012). However, one of the important aspects of earnings management that

[2] Gunny (2010) suggests that managers who engage in REM to just meet earnings benchmarks have better subsequent performance than firms that do not engage in REM and miss earnings benchmarks.

has not gained enough attention is whether how firms manage earnings depends on where the firm is located at. As the costs of REM and AEM are likely to be conditional on firm location, we contend that *where* firms are located (urban vs. rural) influences *how* firms manage earnings (REM vs. AEM).

On one hand, we expect urban firms to have a lower level of REM and a higher level of AEM than rural firms for the following two reasons. First, the geographic proximity between urban firms and outside investors and financial analysts increases familiarity, reduces information asymmetry, and lowers the information acquisition costs. As the cost of monitoring is conditional on the information acquisition cost, urban firms are associated with strengthened monitoring. Hence, under the pressure of meeting earnings target, urban firms are less likely to use REM because of the negative influence of REM in long-term firm value. Second, compared to AEM, REM is harder to detect by outsiders without access to inside information. As investors have easier access to the informal information of urban firms and become more familiar to the urban firms, they are likely to have a better understanding of the firms' operation, thus a strengthened ability to identify REM and to understand its negative long-term implications. Because REM and AEM can be used as substitutes in earnings management (Zang, 2012), we expect urban firms to have a lower level of REM and a higher level of AEM than rural firms.

On the other hand, it is possible that we fail to find empirical evidence to support our expectation. First, urban firms are under greater scrutiny from auditors and regulators. The U.S. Securities and Exchange Commission (SEC) is a regulatory and enforcement agency, headquartered in Washington D.C, with 11 regional offices across the country.[3] Kedia and Rajgopal (2011) shows that firms located closer to the SEC, which are more likely to be urban firms in our sample, are less likely to restate their financial statements. Second, prior literature shows a variety of firm-specific characteristics that lead to firms' choice between AEM and REM (Cohen and Zarowin 2010; Zang 2012). If the effect of a firm's geographic location on earnings management choice correlates with the effect of firm characteristics

[3] The eleven SEC regional offices are located in Atlanta, Boston, Chicago, Denver, Fort Worth, Los Angeles, Miami, New York, Philadelphia, Salt Lake City, and San Francisco. Nine of the ten cities classified as Metro areas in our study have an SEC regional office.

identified in the prior literature, we may fail to find a meaningful influence of firms' geographic location on their earnings management choice.

According to the above discussion, the relation between firms' geographic locations and their earnings management choice is an open, empirical question. Therefore, we address the research question by studying the following null hypothesis:

H1: *There is no relation between firm geographic location and managers' earnings management decisions.*

2.3.2 Cross-Sectional Analyses

We further explore two cross-sectional predictions that examine the variation in investors' access to informal information and monitoring effectiveness.

Variation in Firm Complexity

The seminal paper by Demsetz and Lehn (1985) suggests that managers of firms with more volatile operating environments have a higher degree of moral hazard. Himmelberg, Hubbard, and Palia (1999) support Demsetz and Lehn (1985) by documenting additional firm characteristics, such as R&D and advertising, proxy for the scope of managerial discretion. Furthermore, Bushman, Chen, Engel, and Smith (2004) expand the characteristics of the scope of moral hazard by adding organizational complexity as another component. Collectively, these studies conjecture that managers use more discretion in more complex firms because of the difficulty of monitoring. Bushman, Chen, Engel, and Smith (2004) and Cheng, Lee, Shevlin (2016) show that earnings management increases in firm complexity. We propose that this positive relation is modified by firm location. Urban firms are associated with greater investor familiarity and lower asymmetric information, increasing the difficulty of managing earnings without being detected.

Therefore, our next hypothesis is as follows:

H2: *The relation between firm complexity and managers' earnings management decisions varies across firms' geographic locations.*

Variation before and after the Passage of SOX

Cohen et al. (2008) investigate AEM and REM surrounding the passage of SOX in 2002 and find that AEM increased steadily until the passage of SOX but decreased dramatically after the passage of SOX. In contrast, REM declined prior to SOX and increased significantly after SOX. Their results suggest that REM is harder to detect and firms switch from AEM to REM in response to the higher scrutiny of accounting practice after SOX. Cohen et al. (2008)'s findings are further supported by Zang (2012). As investors gain familiarity of urban firms through easy access to the informal information, REM are more likely to be identified by investors. Thus, we expect the influence of SOX on earnings management decisions to be stronger in rural firms. Thus, we expect the effect of SOX on earnings management decisions is conditional on firm location. This leads to the third hypothesis:

H3: *The influence of SOX on earnings management decisions varies across firms' geographic locations.*

III. Research Design

3.1 Measurements of Geographic Location

Consistent with existing literature, we identify firms' geographic locations with their headquarters locations obtained from Compustat (Loughran and Schultz 2005; Loughran 2007&2008; John et al. 2011; Gao, Ng, and Wang 2011). Using the 2010 Census, we classify urban firms as those headquartered in one of the ten largest metropolitan statistical areas (MSA) and rural firms as those headquartered in other areas. Specifically, the indicator variable *Urban* is given a value of 1 if a firm's headquarters is in New York City, Los Angeles, Chicago, Washington, San Francisco, Boston, Dallas-Fort Worth, Philadelphia, Houston, and Miami, and zero in other areas.

In the robustness check, we use alternative measures to define urban vs. rural firms. A longer distance to major airports imposes higher transportation costs and inconvenience to outside monitors, which may reduce their visits to the firm to obtain firsthand information (Loughran 2008; John et al. 2011) and consequently the effectiveness of monitoring (John et al. 2011). The Federal Aviation

Administration (FAA) classifies major airports as the large and medium-sized commercial service airport hubs that account for at least 0.25% of total passenger boarding. We create an indicator variable, *Urban1*, which equals one if the minimum distance between a company's headquarters and a major airport is below the sample median and zero otherwise. Similarly, location proximity to large cities makes firms more accessible to outside analysts and institutional investors, leading to reduced information asymmetry and improved monitoring effectiveness. *Urban2* is an indicator variable equals to one if the number of top 100 cities within 100 miles radius from a firm's headquarters is above the sample median and zero otherwise.

3.2 Measurements of Earnings Management

3.2.1 Real earnings management

Following the existing literature (Roychowdhury 2006; Kim , Park, and Weir 2012; McGuire, Omer, and Sharp 2012; Brown, Chen, and Kim 2015; Chen, Lee, and Shevlin 2016), we investigate managerial manipulation of real activities with two individual metrics and one aggregate metrics ($RM_{AGGREGATE}$). The two individual metrics include overproducing inventory to reduce COGS (RM_{PROD}) and cutting discretionary expenses (RM_{DISX}), such as R&D, advertising, and SG&A expenses. Because managers may engage in both methods to artificially inflate reported earnings (Cohen and Zarowin 2010; McGuire et al. 2012), we capture the total effect by using the sum of abnormal production costs and abnormal discretionary expenditures ($RM_{AGGREGATE} = RM_{PROD} + RM_{DISX}$).

Abnormally high production cost (RM_{PROD}) occurs when managers spread the fixed production costs over a higher number of units produced through overproducing inventory. To calculate overproduction (RM_{PROD}), we begin by estimating the normal production level using the model in Roychowdhury (2006), where $PROD_{it}$ is the sum of *COGS* and the change in inventory during the year:

$$\frac{PROD_{it}}{ASSETS_{i,t-1}} = k_1 \frac{1}{ASSETS_{i,t-1}} + k_2 \frac{SALES_{it}}{ASSETS_{i,t-1}} + k_3 \frac{\Delta SALES_{it}}{ASSETS_{i,t-1}} + k_4 \frac{\Delta SALES_{i,t-1}}{ASSETS_{i,t-1}} + \varepsilon_{it} \quad (1)$$

We estimate equation (1) each year across all industries with a minimum of 15 observations, where industries are classified using two-digit SIC.[7] Kothari, Mizik, and Roychowdhury (2016) posit that some firms may systematically deviate from industry-year norms, resulting in model misspecification. We follow their recommendations to control this issue. First, we estimate the deviation in a firm's production costs from the cross-sectional mean each year, and then calculate the changes in the deviations from year *t-1* to *t*. Second, we run the model (1) and estimate the residual for each sample observation. Lastly, we calculate the abnormal production cost (RM_{PROD}) as the difference between the firm-year residual and the mean residual of the sample in each year. A higher value of abnormal production costs (RM_{PROD}) indicates a more aggressive real earnings management through reducing the COGS.

To capture firms' real earnings management activities through cutting discretionary expenditures (RM_{DISX}), we first follow Roychowdhury (2006) to estimate the levels of normal discretionary expenditures using the following equation:

$$\frac{DISX_{it}}{ASSETS_{i,t-1}} = k_1 \frac{1}{ASSETS_{i,t-1}} + k_2 \frac{SALES_{i,t-1}}{ASSETS_{i,t-1}} + \varepsilon_{it} \quad (2)$$

Where $DISX_{it}$ is the discretionary expenditures, including R&D, advertising, and SG&A expenditures in year t. Model (2) is estimated cross-sectionally for industry-years with a minimum of 15 observations. The abnormal level of discretionary expenditures is the difference between the actual level and the predicted level. We then follow Kothari et al. (2016) to adjust the above calculated abnormal level of discretionary expenditures to the difference between the estimated residuals and the mean value of the residuals across sample years for the same firm. As in Zang (2012), we multiply the residuals by negative one to obtain $RM_{DISX.}$ As such, a higher value of RM_{DISX} indicates more aggressive real earnings management through cutting discretionary expenditures.

[7] We also use Fama and French 48 industries classification and still obtain similar results.

3.2.2 Accrual earnings management

We measure accruals with the performance-matched discretionary accruals, constructed as the difference in the discretionary accruals between the firm and its matching firm, which is selected from the same industry classified using two-digit SIC code and has the closest return on assets (ROA) each year (Kothari, Leon, and Wasley 2005). The discretionary accruals are the difference between firms' actual and normal accruals, which are the residuals estimated from modified Jones (1991) model cross-sectionally for each industry-year using the following equation:

$$\frac{Accruals_t}{A_{t-1}} = \alpha_1 \left(\frac{1}{A_{t-1}}\right) + \alpha_2 \left(\frac{\Delta S_t}{A_{t-1}}\right) + \alpha_3 \left(\frac{PPE_t}{A_{t-1}}\right) + \varepsilon_t \quad (3)$$

Where $Accruals_t$ is the earnings before extraordinary items and discontinued operations minus the operating cash flows reported in the statement of cash flows in year t (Hribar and Collins 2002).

3.3 Empirical Specification

We adopt the following model to investigate the impact of a firm's geographic location on earnings management, where $EM_{i,t}$ is one of the four earnings management proxies: (1) $RM_{AGGREGATE}$, (2) RM_{PROD}, (3) RM_{DISX}, and (4) Discretional accrual *DA* for firm i in year t:

$$EM_{i,t} = \delta_0 + \delta_1 URBAN_{i,t} + \delta_n Controls_{i,t} + \epsilon_{i,t} \quad (4)$$

The variable of interest is $URBAN$, which is given a value of one for urban firms and a value of zero for rural firms.

We control CEO compensation, board structure, and accounting variables related to earnings management in the existing literature to mitigate the concern that the effect of geographic location merely captures their effects. Managers with greater sensitivity of personal wealth to firm stock price have strengthened incentives to manipulate earnings (Cheng and Warfield 2005, Wang and Warfield 2005; Bergstresser and Philippon 2006; Jiang, Petroni, and Wang 2010). However, Hribar and Nichols (2007), Erickson, Hanlon, and Maydew (2006), and Armstrong, Jagolinzer, and Larcker (2010) show that the

positive relation is due to model misspecification. CEO ownership is measured with *Delta*, which is the natural logarithm of one plus the change in the value of CEO's equity portfolio for a 1% change in the value of the firm's common stock price (Core and Guay 2002; Coles, Daniel, and Neveen 2006). Tying CEO wealth to stock return volatility, option compensation encourages CEOs to take risky investments. Armstrong, Larcker, Ormazabal, and Taylor (2013) document a positive association between *Vega* and accounting irregularities. We control CEO risk-taking incentives with *Vega*, constructed as the natural logarithm of one plus the change in the value of CEO's stock option portfolio for a 1% change in the annualized standard deviation of the firm's stock returns. We also control CEO annual compensation *Tdc1*, which is calculated as the natural logarithm of one plus the total annual compensation. CEOs with shorter tenure are less known to the labor market and may adopt policies to favorably influence the market's perception of their quality (Gibbons and Murphy 1992; Hermalin and Weisbach 1998; Holmstrom 1999), resulting a higher incentive to inflate earnings (Ali and Zhang 2015). We measure CEO tenure with *CEO tenure*, constructed as the natural logarithm of one plus the number of years a CEO has serviced as CEO.

Effective board monitoring reduces the likelihood of managerial manipulation of earnings (Beasley 1996). We measure the quality of board monitoring with the percentage of independent directors and the board gender diversity. Studies document a negative relation between earnings management and independent director representation (Beasley 1996; Klein 2002; Xie, Davidson, and DaDalt 2003; Peasnell, Pope, and Young 2005). Percentage of independent director, *Pind*, is the number of directors who are not employees or linked to firms through business relationships scaled by the total number of directors. Female directors are more likely to check on CEO decisions than male directors and thus represent good governance (Dallas 2002; Valenti 2008). A higher percentage of female directors are associated with higher earnings quality (Peni and Vahamaa 2010; Srinidhi, Gul, and Tsui 2011). The gender diversity, *Per_female_dir*, is the ratio of number of female directors to the number of total directors.

Analysts may prevent earnings manipulation through effective monitoring, or induce earnings manipulation because firms are under pressure of meeting or beating analysts' forecasts. We use *Analyst*, constructed as the natural logarithm of one plus the number of analysts following the firm, to control the influence of analysts on earnings management. The market rewards firms' beat or meet earnings forecasts with higher return and punish firms' miss forecasts with a significant drop in stock prices (Bartov, Givoly, and Hayn 2002; Kasznik and McNicholes 2002). Firms who have the habit of beating earnings forecasts may be under higher pressure to continue to do so, resulting in more earnings management (Cohen and Zarowin 2010; Zang 2012). *Beat* is the number of times that a firm's actual EPS is larger than the mean analysts' earnings forecasts in the past four quarters. In addition to independent directors and female directors, auditors can constrain manipulative earnings management through effective monitoring. *Big 8* is an indicator variable equals to one if firms have one of the big 8 auditing firms as their auditor, and zero otherwise. Auditors' experience and ability to detect earnings management increases in their tenure. *Auditor_tenure* is the natural logarithm of one plus the number of years an auditor has served as an auditor for a firm.

Barton and Simko (2002) indicate that net operating assets position represents previous earnings management. *NOA* is calculated as the sum of shareholders' equity less cash and marketable securities plus total debt at the beginning of the year, scaled by the lagged total assets. Firms with higher growth are likely to face greater pressure from the capital markets and thus are more likely to conduct earnings management (Skinner and Sloan 2002; Erickson, Hanlon, and Maydew 2006; Armstrong et al. 2013). We measure firms' growth rate with *Size*, *Tobin's Q*, *Intangibles*, and *Firm_age*. Lastly, we include firm profitability (*ROA*) and capital structure (*Leverage*) (Roychowdhury 2006; Cohen and Zarowin 2010). The variable definitions are presented in Appendix A.

IV. Sample Selection and Descriptive Statistics

Our sample is a merged sample from Execucomp, Compustat, CRSP, and Institutional Brokers Estimate System (I/B/E/S) in the period of 1996 to 2013. Following the existing literature, we exclude

firms in financial industries (SIC codes 6000-6999) and utility industries (SIC codes 4900-4949) because these firms are likely to have different financial reporting incentives due to their different regulations. After deleting missing values on key variables, we have an unbalanced final sample of 10,660 firm-year observations.[8]

Panel A and Panel B in Table 1 present sample descriptive statistics and univariate analysis results, respectively. All continuous variables are winsorized at the top and bottom 1% of the sample distribution to mitigate potential bias arising from the sample outliers. As shown in Panel A, 40.35% of our sample firms are classified as urban-located using *Urban* as the proxy. 50.2% of firms are defined as urban-located when the distance to major airports is used as proxy, and 28.61% of firms are urban-located when the number of large cities within 100 miles of radiance is used. The mean and median value of $RM_{AGGREGATE}$ are 0.042 and 0.0311, respectively. RM_{PROD} has the mean (median) of 0.0062 (0.0066), and RM_{DISX} has the mean (median) of 0.0364 (0.0238). The mean and median value of *DA* are -0.0238 and -0.02, respectively. All variable distributions are consistent with existing studies.

We segment the sample into two subsamples based on the location of each firm, urban vs. rural. The univariate tests of the mean difference for earnings management variables, CEO compensation variables, and variables proxy for the board and auditor monitoring effectiveness are presented in Panel B. On average, rural firms are associated with significantly higher aggregate REM. In addition, rural firms' REM is mainly through overproduction. Further, rural firms have significantly less AEM than urban firms.

[Insert Table 1 about here]

Table 2 presents Pearson and Spearman correlations among key variables. *URBAN* is negatively correlated with $RM_{AGGREGATE}$ (Pearson correlation of -0.0272) and RM_{PROD} (Pearson correlation of -0.0452),

[8] Our initial sample is a merged sample from Compustat and Execucomp, which include 19,286 firm-year observatiosn. This sample size is redued to 15,844 firm-year observations after merging with I/B/E/S. The sample size is further reduced to 11, 838 firm-year observations after merging with ISS. After deleting missing values on key variables, we have 10,660 firm-year observations.

but positively correlated with *DA* (Pearson correlation of 0.0234). In addition, consistent with prior studies, we find a significant positive relation between RM_{PROD} and RM_{DISX} (Pearson correlation of 0.3934), between *Delta* and $RM_{AGGREGATE}$ (Pearson correlation of 0.0473), between *Vega* and $RM_{AGGREGATE}$ (Pearson correlation of 0.032), and a significant negative relation between *Delta* and *DA* (Pearson correlation of -0.043), between *Vega* and *DA* (Pearson correlation of -0.064).

[Insert Table 2 about here]

V. Results

We provide our main results in this section. All models include industry and year variables to control omitted variable bias due to different industry characteristics and time effects, and are estimated using ordinary least squares (OLS) regression with the standard errors robust to heterogeneity.

5.1 The Association between Firms' Geographic Locations and Earnings Management

Table 3 presents the results of tests on the association between earnings management and urban location. The dependent variables are $RM_{AGGREGATE}$, RM_{PROD}, RM_{DISX}, and *DA* in models (1), (2), (3), and (4), respectively. The coefficient on indicator variable *URBAN* is negative and significant at 1% level in models (1) and (2), suggesting that urban firms are associated with lower aggregate real earnings management that mainly comes from overproducing inventory. The parameter estimates on *URBAN* in models (1) and (2) indicate firms in urban locations are associated with a 0.0119 reduction in $RM_{AGGREGATE}$ and a 0.008 reduction in RM_{PROD}, respectively. This supports our hypothesis $\mathbf{H_1}$. The coefficient on DA is 0.0044 with significance at 1% level, suggesting that accrual earnings management in urban firms is higher than that rural firms by 0.0044. Collectively, we find that firms in urban locations significantly reduce the extent of real earnings management, but increase accrual earnings management.

The results of control variables are generally consistent with the literature. Firms offer CEOs with higher equity incentives are associated with more earnings management (Cheng and Warfield 2015;

Bergstresser and Philippon 2006; Burns and Kedia 2006; Cornett, Marcus, and Tehranian 2008). Executives adopt real earnings management to boost future performance in response to analysts' pressure (Irani and Oesch 2016). Firms with higher Tobin's Q and intangible assets conduct more real earnings management and less earnings management through discretionary accruals.

[Insert Table 3 about here]

5.2 Variation in Firm Complexity

The effectiveness of monitoring in constraining manipulative activities to inflate earnings should be conditional on firms operating complexity. Complex firms and firms operate in an R&D intensive industry have greater incentives to conduct earnings management (Chen et al. 2016). As such, we expect location proximity to shareholders has a greater impact on earnings management in those firms. Following Chen et al. (2016), we measure R&D intensity with *IND_RD*, which equals to one if the average R&D expenditure in the industry-year is above the sample median and zero otherwise, where industries are classified using two-digit SIC code. We employ Coles et al. (2008) to classify complex firms with size, leverage, and age. Specifically, we conduct factor analysis to convert these three variables into an indicator variable *Complex* with a value of one if its value is above the sample median and zero otherwise.

We interact *IND_RD* and *Complex* separately with *URBAN* and report the results in Panels A and B of Table 4, respectively. In Panel A, the coefficient on *URBAN* is insignificant in models (1), (2), and (3), which indicates that firms' geographic locations have no influence on real earnings management in non-complex firms. The coefficient on *IND_RD* is significantly positive in models (1) and (2), suggesting that firms with greater R&D intensity are more likely to use REM when they are located in rural areas where information accessibility and effective monitoring are weakened. However, the significantly negative coefficient on the interaction between *URBAN* and *IND_RD* in models (1), (2), and (3) implies that, compared to rural firms, urban firms with high R&D intensity employ less REM.

Specifically, the parameter estimates on the interaction between *URBAN* and *IND_RD* in models (1), (2) and (3) indicate that, in firms with high R&D intensity, the usage of $RM_{AGGREGATE,}$ $RM_{PROD,}$ and RM_{DISX} in urban firms are lower than rural firms by -0.0299, -0.0166, and -0.0145, respectively. Furthermore, the sum of the coefficient of *IND_RD* and the interaction between *URBAN* and *IND_RD* is insignificant, suggesting better monitoring in urban firms offsets the increased incentives for REM in high R&D intensity firms.

Similar results are found when investigating the moderating effect of firms' complexity on the association between real earnings management and geographic locations. Specifically, consistent with Chen et al. (2016), we find complex firms utilize more real earnings management. However, when firms are located in urban areas where information accessibility and effective monitoring are strengthened, such real earnings management are largely reduced. Collectively, we find strong support for $\boldsymbol{H_3}$.

[Insert Table 4 about here]

5.3 Variation before and after the Passage SOX

Graham et al. (2005) and Cohen, Dey, and Lys (2008) document a reduction in accrual earnings management and an increase in real earnings management post-SOX. They propose that the strengthened information disclosure requirements introduced in SOX make accrual-based earnings management more detectable and thus costly, creating incentives for firms to adopt real earnings management. We expect the greater monitoring effectiveness and information accessibility in urban located firms reduce managerial incentives to switch to value-decreasing real activities manipulations in the post-SOX period. We create an indicator variable *SOX* that equals to one if the fiscal year is after 2003 and zero otherwise (Chen et al. 2016). We interact *SOX* with *URBAN* to investigate the change in the association between location proximity and earnings management induced by the exogenous shock, *SOX*. The results are reported in Table 5. Consistent with the literature, the coefficient on SOX in real earnings management regressions is significantly positive, which suggests that rural firms implement more manipulative real

activities in earnings management post-SOX. Moreover, the coefficients on the interactions in models (1), (2), and (3) are significantly negative, indicating that the location proximity to large investor base of urban firms effectively mitigates increased real earnings management post-SOX.

[Insert Table 5 about here]

VI. Additional Tests

We recognize that our analyses might be subject to endogeneity concerns because, arguably, the urban location may be a proxy for some governance mechanisms and/or accounting variables uncontrolled in the model which affect the extent of earnings management. We mitigate this concern by including a comprehensive list of control variables in our main analysis that is likely to be related to governance quality, such as proxies for CEO power and board monitoring effectiveness, and various accounting variables found to be related to managerial manipulative actions in prior studies. In this session, we carry out several additional tests to check whether our results are driven by biases in the sample selection, variable identification, or endogeneity.

6.1 Heckman Selection Model

Firms that just meet or beat important earnings benchmarks are more likely to manage earnings (Burgstahler and Dichev 1997; Degeorge, Patel, and Zeckhauser 1999; Bartov, Givoly, and Hayn 2002). Following prior studies, we classify firms as earnings management suspects when they have earnings that just beat/meet the prior year's earnings, zero earnings, and analysts' consensus forecast. We address the potential bias arising from the systematic difference in firms more and less likely to engage earnings management with Heckman (1979) two-step selection model (Zang 2012). In the first step, we estimate the likelihood of being earnings management suspects using all sample firms and obtain the inverse Mills ratio (IMR) with the following model, where $Suspect$ is an indicator variable with a value of one if a firm just beats or meets one of the aforementioned earnings benchmarks and zero otherwise:

$$Suspect = \beta_0 + \beta_1 Beat + \beta_2 Bonus + \beta_3 Option + \beta_4 Analysts + \beta_5 Shares + \beta_6 ROA + \beta_7 Leverage + \beta_8 Lagged\_Tobin'sQ + Year + \varepsilon_i \quad (5)$$

We control CEO compensation with *Bonus*, which is the CEO's annual bonus compensation, and *Option*, which is the accumulated value of CEO option portfolio (Cohen and Zarowin 2010). We standardize them by dividing them by the total annual compensation (TDC1), and further adjust the skewness by taking the natural logarithm of one plus their standardized values). The independent variables are chosen according to prior literature (Bartov et al. 2002; Kasznik and McNichols 2002; Zang 2012). In the second step, we repeat the analyses as those in Table 3 using only suspect firms with IMR as an additional control variable to correct for sample selection bias. The results are presented in Table 6.

Panel A reports the results of the first stage of the Heckman selection model. Firms provide CEOs with higher option compensation, followed by more analysts, and have higher growth opportunities and profitability have higher propensity to be classified as suspects (Barth, Elliott, and Finn 1999; Skinner and Sloan 2002; and Zang 2012). Panel B presents the results of the second stage of the Heckman model. There are 1,831 firms identified as earnings management suspects. Controlling for the potential sample selection bias, we find the coefficient on *URBAN* is negative and significant in the model (1) and (2), suggesting that urban firms are associated with significantly fewer earnings management through manipulating real activities, measured by both $RM_{AGGREGATE}$ and RM_{PROD}.

[Insert Table 6 about here]

6.2 Alternative Measures of Urban Firms

To check the robustness of the classification of urban firms, we define urban located firms with two alternative proxies, the distance to major airports and the number of top 100 cities within 100the -mile radiance. We use the sample median as a cutoff point to create two indicator variables, *Metro1* and *Metro2*, and repeat the analyses as those in Table 3. The results are largely consistent. The coefficients on both urban location proxies are negative and significant in real earnings management models, implying

firms adopt less value-decreasing real earnings management when they are subject to strengthened oversight in urban locations.

[Insert Table 7 about here]

6.3 Simultaneous Equation Model

Earnings management through manipulation of real activities and financial reporting are likely to be correlated. Studies show that firms may use discretionary accruals when they fail to use only real earnings management to meet analysts' forecast. As such, we implement a simultaneous system of equations to allow the correlation between real and accrual earnings management. Specifically, we estimate a system of two equations using three-stage least squares estimator:

$$RM_{Aggregate} = \beta_0 + \beta_1 URBAN + \beta_2 Delta + \beta_3 Vega + \beta_4 Per_{female_{dir}} + \beta_5 Pind + \beta_6 Analyst + \beta_7 Beat + \beta_8 Big4 + \beta_9 Auditor_{tenure} + \beta_{10} NOA + \beta_{11} Size + \beta_{12} Tobin'sQ + \beta_{13} ROA + \beta_{14} Leverage + \beta_{15} FirmAge + \beta_{16} Intangibles + \beta_{17} Litigation + Year_t + Ind_j + \varepsilon_i \quad (6)$$

$$DA = \beta_0 + \beta_1 URBAN + \beta_2 Vega + \beta_3 Tdc1 + \beta_4 CEO\_tenure + \beta_5 Pind + \beta_6 Analyst + \beta_7 Beat + \beta_8 Big4 + \beta_9 Auditor_{tenure} + \beta_{10} NOA + \beta_{11} Size + \beta_{12} Tobin'sQ + \beta_{13} ROA + \beta_{14} Intangibles + \beta_{15} Litigation + Year_t + Ind_j + \varepsilon_i \quad (7)$$

Where *URBAN* is the urban location proxy. We control for industry and year effects in all regressions. We assume $URBAN$, $Analyst$, $Beat, Big$, $Auditor_{tenure}$ and $Tobin'sQ$ as additional endogenous variables.

The results are reported in Table 8. Model (1) and (2) present the results when the dependent variable is total real earnings management and accrual earnings management, respectively. The coefficient on URBAN in the model (1) is -0.0122 with a significance level of 1%, implying that urban firms are associated with a reduction in $RM_{Aggregate}$ of 0.0122 than rural firms. The coefficient on URBAN in the model (2) is significant with a value of 0.0087, which indicates that accrual earnings

management in urban firms is higher than rural firms by 0.0087. Collectively, our robustness tests results are consistent with our baseline results.

[Insert Table 8 about here]

VII. Conclusion

In this study, we introduce a new concept, corporate proximity to the metro area, to the accounting research. Following Loughran and Schultz (2005) and John et al. (2011), we classify companies as urban or rural based on the proximity of a company's headquarters to top ten U.S. metropolitan areas. We provide large-sample evidence supporting the significant impact of firms' geographic locations (urban vs. rural) on their earnings management decisions, including both real earnings management and accrual earnings management.

Our evidence suggests that urban firms use less REM and more AEM than rural firms. Although firm complexity is found to encourage REM in prior studies, we find that such positive relation is mitigated in urban firms. In addition, our results indicate that the greater use of REM after the passage of SOX is solely driven by rural firms. Consistent with our main results, when we narrow down our sample to earnings management suspect firms, we find that suspect firms in the urban areas are less likely to use REM and more likely to use AEM than rural firms.

We contribute to the earnings management literature in two ways. First, to the best of our knowledge, our study is the first to show *how* firms manage earnings is conditional on *where* firms located. Prior literature has focused on *how*, *why*, and *when* firms manage earnings, but very few studies have explored *where* firms manage earnings. Second, we show that firms' geographic locations, as a proxy for information accessibility and monitoring effectiveness, influence managers' tradeoff decisions of earnings management activities, incremental to the economic determinants addressed in the prior studies.

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Table 1
Descriptive Statistics and Univariate Test

This table presents descriptive statistics of the sample. The sample is a merged sample from Compustat, EXECUCOMP, CRSP, and I/B/E/S, and excludes financial firms (SIC 6000–6999) and regulated utilities (SIC 4900–4949). The sample covers 10,660 firm-year observations from fiscal year 1996-2013. Panel A reports the sample descriptive statistics. Panel B presents univariate test results. Refer to Appendix A. for detailed variable definitions. All continuous variables are winsorized at upper and lower 1% of the sample distribution.

Panel A: Sample Descriptive Statistics

	N	Mean	SD	P10	P25	P50	P75	P90
$RM_{AGGREGATE}$	10,660	0.0420	0.2025	-0.1760	-0.0646	0.0311	0.1375	0.2761
RM_{PROD}	10,660	0.0062	0.1138	-0.1243	-0.0526	0.0066	0.0654	0.1355
RM_{DISX}	10,660	0.0364	0.1265	-0.0945	-0.0300	0.0238	0.0898	0.1847
DA	10,660	-0.0238	0.0756	-0.1130	-0.0628	-0.0200	0.0178	0.0618
URBAN	10,660	0.4035	0.4906	0.0000	0.0000	0.0000	1.0000	1.0000
Urban1	10,660	0.5020	0.5000	0.0000	0.0000	1.0000	1.0000	1.0000
Urban2	10,660	0.2861	0.4520	0.0000	0.0000	0.0000	1.0000	1.0000
Delta	10,660	5.5313	1.4614	3.7283	4.5750	5.5197	6.4809	7.3807
Vega	10,660	3.7798	1.7801	0.6830	2.8729	4.0252	5.0532	5.8711
Tdc1	10,660	8.0430	0.9964	6.7533	7.3572	8.0599	8.7311	9.3174
CEO_tenure	10,660	1.7483	0.9179	0.6931	1.0986	1.7918	2.3979	2.9444
Per_female_dir	10,660	0.0975	0.0961	0.0000	0.0000	0.1000	0.1538	0.2222
Pind	10,660	0.7141	0.1605	0.5000	0.6250	0.7500	0.8571	0.8889
Analyst	10,660	2.2583	0.6797	1.3863	1.7918	2.3026	2.7726	3.1355
Beat	10,660	1.9339	1.3558	0.0000	1.0000	2.0000	3.0000	4.0000
Big 4	10,660	0.8928	0.3094	0.0000	1.0000	1.0000	1.0000	1.0000
Auditor_tenure	10,660	2.4009	0.7272	1.3863	1.9459	2.4849	2.9444	3.2958
NOA	10,660	2.3451	1.9907	0.9547	1.2591	1.7701	2.6886	4.2050
Size	10,660	7.3267	1.4077	5.6343	6.3165	7.2057	8.1916	9.2273
Tobin's Q	10,660	2.1234	1.3382	1.0503	1.2860	1.7071	2.4508	3.6696
ROA	10,660	0.0647	0.0934	-0.0155	0.0412	0.0749	0.1097	0.1508
Leverage	10,660	0.1952	0.1717	0.0000	0.0318	0.1843	0.3030	0.4013
Firm_age	10,660	2.9304	0.7533	1.9459	2.3979	2.9444	3.4965	3.8501
Intangibles	10,660	0.4916	0.3564	-0.0384	0.2893	0.5820	0.7714	0.8707
Litigation	10,660	0.2383	0.4260	0.0000	0.0000	0.0000	0.0000	1.0000

Panel B: Univariate Test

	Rural	Metro	Difference	(p-value)
RMAGGREGATE	0.0466	0.0353	0.0112	0.0045
RMPROD	0.0105	0.0000	0.0105	0.0000
RMDISX	0.0365	0.0363	0.0003	0.9175
DA	-0.0253	-0.0217	-0.0036	0.0158
Delta	5.5105	5.5620	-0.0515	0.0718
Vega	3.7817	3.7770	0.0048	0.8930
Tdc1	7.9803	8.1358	-0.1556	0.0000
CEO_tenure	1.7271	1.7797	-0.0527	0.0037
Per_female_dir	0.0977	0.0972	0.0005	0.7805
Pind	0.7126	0.7164	-0.0037	0.2411
Analyst	2.2437	2.2799	-0.0362	0.0072
Beat	1.9220	1.9514	-0.0294	0.2724

Table 2
Correlation

This table presents variable correlations. The correlations with significance at above 10% level are marked with bold. Refer to Appendix A. for detailed variable definitions.

	$RM_{AGGREGATE}$	RM_{PROD}	RM_{DISX}	DA	Urban	Delta	Vega	Tdc1	CEO_tenure	Per_female_dir	Pind	Analyst	Beat	Big 4
RM_{PROD}	**0.8113**													
RM_{DISX}	**0.8461**	**0.3934**												
DA	0.0055	**0.0599**	**-0.045**											
URBAN	**-0.0272**	**-0.0452**	-0.001	**0.0234**										
Delta	**0.0473**	**-0.0225**	**0.0984**	**-0.043**	**0.0173**									
Vega	**0.032**	0.0004	**0.0514**	**-0.064**	-0.0013	**0.4278**								
Tdc1	**0.021**	**-0.0245**	**0.057**	**-0.0489**	**0.0766**	**0.388**	**0.499**							
CEO_tenure	0.0109	**0.0182**	0.0022	**0.0306**	**0.0281**	**0.3303**	0.0032	**-0.0399**						
Per_female_dir	**0.0206**	0.0128	**0.0163**	0.0088	-0.0027	**0.0741**	**0.1659**	**0.2701**	**-0.1175**					
Pind	0.0054	**0.0203**	-0.0078	0.0038	0.0114	**-0.0647**	**0.1157**	**0.2795**	**-0.0418**	**0.2404**				
Analyst	**0.0654**	0.0041	**0.101**	**-0.0673**	**0.0261**	**0.4147**	**0.3308**	**0.4636**	0.0029	**0.1379**	**0.0907**			
Beat	**-0.0504**	**-0.0874**	-0.0026	**-0.0414**	0.0106	**0.1845**	**0.0687**	**0.2002**	0.0158	**0.0316**	**0.0776**	**0.083**		
Big 4	**0.0168**	**0.032**	-0.0006	-0.0088	**-0.0963**	**0.058**	**0.117**	**0.1708**	**-0.0487**	**0.1495**	**0.1603**	**0.1141**	**0.0441**	
Auditor_tenure	0.0027	**0.0185**	-0.0126	**0.0227**	**-0.0703**	**0.0197**	**0.0595**	**0.1508**	0.0009	**0.1272**	**0.1235**	**0.0974**	-0.0037	**0.0582**

Table 3
Location and Earnings Management

This table presents regression results of tests on location effect on earnings management. All models control industry and year effects, where industry is defined per Fama and French (1997) 49 industry classifications. Heteroscedasticity robust t-statistics are reported in parentheses. Referred to Appendix A for detailed variable descriptions. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1) $RM_{AGGREGATE}$	(2) RM_{PROD}	(3) RM_{DISX}	(4) DA
URBAN	-0.0119***	-0.0080***	-0.0038	0.0044***
	(-2.85)	(-3.43)	(-1.49)	(2.93)
Delta	0.0075***	0.0024**	0.0052***	0.0001
	(3.80)	(2.19)	(4.25)	(0.16)
Vega	-0.0031**	0.0009	-0.0041***	-0.0014***
	(-2.08)	(1.09)	(-4.54)	(-2.72)
Tdc1	-0.0039	-0.0051***	0.0013	-0.0031***
	(-1.21)	(-2.81)	(0.67)	(-2.60)
CEO_tenure	-0.0007	0.0013	-0.0019	0.0027***
	(-0.30)	(0.97)	(-1.34)	(2.89)
Per_female_dir	0.0429*	0.0184	0.0141	-0.0116
	(1.81)	(1.38)	(0.97)	(-1.35)
Pind	-0.0016	0.0012	-0.0005	-0.0025
	(-0.11)	(0.14)	(-0.05)	(-0.44)
Analyst	0.0190***	0.0042*	0.0150***	-0.0055***
	(4.34)	(1.75)	(5.60)	(-3.38)
Beat	-0.0058***	-0.0039***	-0.0019**	-0.0030***
	(-3.73)	(-4.57)	(-1.97)	(-5.13)
Big 4	-0.0057	-0.0023	-0.0032	-0.0011
	(-0.83)	(-0.60)	(-0.74)	(-0.41)
Auditor_tenure	-0.0019	0.0014	-0.0030	-0.0001
	(-0.62)	(0.82)	(-1.63)	(-0.11)
NOA	-0.0248***	-0.0032	-0.0203***	0.0023
	(-5.82)	(-1.44)	(-7.92)	(1.44)
Size	0.0068**	0.0042**	0.0028	0.0029***
	(2.26)	(2.56)	(1.54)	(2.62)
Tobin's Q	0.0160***	-0.0037	0.0180***	-0.0122***
	(2.77)	(-1.20)	(5.23)	(-5.52)
ROA	-0.1584***	-0.1817***	0.0133	0.1694***
	(-4.92)	(-10.13)	(0.67)	(13.48)
Leverage	-0.0692***	-0.0309***	-0.0419***	0.0079
	(-4.93)	(-3.97)	(-4.93)	(1.54)
Firm_age	0.0073**	0.0021	0.0054***	0.0002
	(2.40)	(1.24)	(2.91)	(0.21)
Intangibles	0.0526***	0.0067	0.0467***	-0.0299***
	(7.34)	(1.63)	(10.71)	(-10.04)
Litigation	0.0009	-0.0031	0.0014	-0.0013
	(0.10)	(-0.68)	(0.24)	(-0.43)
Constant	-0.1633***	-0.0274	-0.1440***	0.0187
	(-4.34)	(-1.24)	(-5.77)	(0.89)
Industry and year effects	Yes	Yes	Yes	Yes
N	10,660	10,660	10,660	10,660
R^2	0.1051	0.1136	0.1337	0.1028

Table 4
Location and earnings management conditional on firm complexity

This table presents regression results of tests the moderating effect of firm complexity on the association between location and earnings management. Panel A measure firm complexity with R&D intensity. *IND_RD* equals to one if the average R&D expenditure in the industry (two-digit SIC code) -year is above the sample median and zero otherwise. Panel B measure firm complexity with a variable constructed from factor analysis using size, leverage and age (Coles et al., 2008). We use sample median as the cutoff point to create indicator variable *Complex*. All models control industry and year effects, where industry is defined per Fama and French (1997) 49 industry classifications. Heteroscedasticity robust t-statistics are reported in parentheses. Referred to Appendix A for detailed variable descriptions. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Industry research and development intensity

	(1) $RM_{AGGREGATE}$	(2) RM_{PROD}	(3) RM_{DISX}	(4) DA
URBAN	0.0065	0.0023	0.0051	0.0059**
	(1.07)	(0.63)	(1.54)	(2.39)
IND_RD	0.0235**	0.0168***	0.0064	-0.0033
	(2.26)	(2.86)	(1.00)	(-0.80)
URBAN *IND_RD	-0.0299***	-0.0166***	-0.0145***	-0.0024
	(-3.73)	(-3.62)	(-3.06)	(-0.78)
Delta	0.0072***	0.0023**	0.0051***	0.0001
	(3.63)	(2.01)	(4.13)	(0.16)
Vega	-0.0033**	0.0008	-0.0042***	-0.0014***
	(-2.22)	(0.96)	(-4.64)	(-2.74)
Tdc1	-0.0037	-0.0050***	0.0015	-0.0030**
	(-1.14)	(-2.77)	(0.75)	(-2.54)
CEO_tenure	-0.0007	0.0013	-0.0019	0.0027***
	(-0.29)	(0.99)	(-1.34)	(2.87)
Per_female_dir	0.0411*	0.0172	0.0135	-0.0114
	(1.73)	(1.29)	(0.93)	(-1.33)
Pind	-0.0043	-0.0005	-0.0015	-0.0024
	(-0.29)	(-0.07)	(-0.17)	(-0.43)
Analyst	0.0186***	0.0040*	0.0148***	-0.0055***
	(4.25)	(1.66)	(5.52)	(-3.41)
Beat	-0.0058***	-0.0039***	-0.0019**	-0.0030***
	(-3.74)	(-4.57)	(-1.98)	(-5.14)
Big 4	-0.0058	-0.0023	-0.0033	-0.0012
	(-0.83)	(-0.59)	(-0.76)	(-0.45)
Auditor_tenure	-0.0019	0.0013	-0.0031*	-0.0001
	(-0.63)	(0.80)	(-1.65)	(-0.13)
NOA	-0.0247***	-0.0031	-0.0202***	0.0023
	(-5.76)	(-1.37)	(-7.88)	(1.41)
Size	0.0073**	0.0045***	0.0030*	0.0029***
	(2.41)	(2.72)	(1.65)	(2.63)
Tobin's Q	0.0156***	-0.0040	0.0179***	-0.0121***
	(2.69)	(-1.29)	(5.19)	(-5.50)
ROA	-0.1588***	-0.1818***	0.0129	0.1692***
	(-4.93)	(-10.12)	(0.65)	(13.48)
Leverage	-0.0674***	-0.0298***	-0.0412***	0.0080
	(-4.82)	(-3.85)	(-4.85)	(1.55)
Firm_age	0.0073**	0.0021	0.0054***	0.0003
	(2.40)	(1.23)	(2.92)	(0.23)
Intangibles	0.0515***	0.0057	0.0467***	-0.0294***
	(7.14)	(1.36)	(10.58)	(-9.75)
Litigation	-0.0004	-0.0039	0.0008	-0.0013
	(-0.05)	(-0.84)	(0.15)	(-0.44)
Constant	-0.0089	0.0295**	-0.0429***	0.0262***
	(-0.34)	(2.06)	(-2.69)	(2.84)
Industry and year effects	Yes	Yes	Yes	Yes
N	10,660	10,660	10,660	10,660
R^2	0.1063	0.1149	0.1344	0.1030

Panel B: Firm complexity				
	(1)	(2)	(3)	(4)
	$RM_{AGGREGATE}$	RM_{PROD}	RM_{DISX}	DA
URBAN	0.0077	0.0027	0.0045	0.0038*
	(1.29)	(0.84)	(1.23)	(1.68)
Complex	0.0147***	0.0085***	0.0058*	0.0024
	(2.65)	(2.79)	(1.70)	(1.16)
URBAN *Complex	-0.0373***	-0.0206***	-0.0156***	0.0014
	(-4.74)	(-4.63)	(-3.23)	(0.46)
Delta	0.0095***	0.0036***	0.0061***	0.0008
	(4.96)	(3.32)	(5.22)	(1.03)
Vega	-0.0032**	0.0008	-0.0041***	-0.0014***
	(-2.12)	(1.02)	(-4.55)	(-2.72)
Tdc1	-0.0008	-0.0033**	0.0028	-0.0020*
	(-0.26)	(-1.98)	(1.50)	(-1.83)
CEO_tenure	-0.0022	0.0004	-0.0026*	0.0023**
	(-0.97)	(0.30)	(-1.83)	(2.55)
Per_female_dir	0.0539**	0.0242*	0.0195	-0.0082
	(2.28)	(1.83)	(1.35)	(-0.95)
Pind	-0.0003	0.0017	0.0002	-0.0017
	(-0.02)	(0.21)	(0.03)	(-0.30)
Analyst	0.0237***	0.0073***	0.0166***	-0.0034**
	(6.36)	(3.59)	(7.16)	(-2.45)
Beat	-0.0058***	-0.0040***	-0.0019**	-0.0030***
	(-3.78)	(-4.60)	(-2.00)	(-5.18)
Big 4	-0.0052	-0.0018	-0.0033	-0.0006
	(-0.76)	(-0.46)	(-0.77)	(-0.24)
Auditor_tenure	0.0019	0.0029*	-0.0007	0.0002
	(0.66)	(1.79)	(-0.36)	(0.15)
NOA	-0.0256***	-0.0034	-0.0209***	0.0025
	(-6.07)	(-1.55)	(-8.20)	(1.59)
Tobin's Q	0.0160***	-0.0042	0.0185***	-0.0133***
	(2.88)	(-1.40)	(5.55)	(-6.24)
ROA	-0.1391***	-0.1729***	0.0243	0.1701***
	(-4.36)	(-9.68)	(1.23)	(13.55)
Intangibles	0.0518***	0.0066	0.0460***	-0.0302***
	(7.19)	(1.59)	(10.54)	(-10.17)
Litigation	0.0008	-0.0034	0.0017	-0.0020
	(0.09)	(-0.75)	(0.30)	(-0.66)
Constant	-0.0192	0.0232	-0.0465***	0.0319***
	(-0.72)	(1.58)	(-2.82)	(3.33)
Industry and year effects	Yes	Yes	Yes	Yes
N	10,660	10,660	10,660	10,660
R^2	0.1034	0.1131	0.1311	0.1018

Table 5
Location and earnings management conditional on SOX

This table presents regression results of tests the moderating effect of SOX on the association between location and earnings management. SOX is an indicator variable equals to one for fiscal year larger or equal to 2003 and zero otherwise. All models control industry and year effects, where industry is defined per Fama and French (1997) 49 industry classifications. Heteroscedasticity robust t-statistics are reported in parentheses. Referred to Appendix A for detailed variable descriptions. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1) $RM_{AGGREGATE}$	(2) RM_{PROD}	(3) RM_{DISX}	(4) DA
URBAN	0.0101	0.0024	0.0069	0.0047*
	(1.39)	(0.60)	(1.54)	(1.70)
SOX	0.0232*	0.0008	0.0211***	0.0056
	(1.87)	(0.12)	(2.74)	(1.27)
URBAN *SOX	-0.0324***	-0.0153***	-0.0157***	-0.0004
	(-3.88)	(-3.28)	(-3.04)	(-0.14)
Delta	0.0079***	0.0026**	0.0054***	0.0001
	(3.98)	(2.34)	(4.38)	(0.17)
Vega	-0.0032**	0.0008	-0.0042***	-0.0014***
	(-2.18)	(1.01)	(-4.62)	(-2.72)
Tdc1	-0.0040	-0.0051***	0.0013	-0.0031***
	(-1.22)	(-2.82)	(0.66)	(-2.60)
CEO_tenure	-0.0011	0.0011	-0.0021	0.0027***
	(-0.48)	(0.82)	(-1.47)	(2.89)
Per_female_dir	0.0419*	0.0179	0.0136	-0.0116
	(1.77)	(1.35)	(0.94)	(-1.35)
Pind	-0.0016	0.0012	-0.0005	-0.0025
	(-0.11)	(0.14)	(-0.05)	(-0.44)
Analyst	0.0184***	0.0039	0.0147***	-0.0055***
	(4.20)	(1.62)	(5.49)	(-3.38)
Beat	-0.0058***	-0.0039***	-0.0019**	-0.0030***
	(-3.75)	(-4.59)	(-1.99)	(-5.13)
Big 4	-0.0044	-0.0017	-0.0025	-0.0011
	(-0.63)	(-0.43)	(-0.58)	(-0.41)
Auditor_tenure	-0.0019	0.0013	-0.0031	-0.0001
	(-0.64)	(0.80)	(-1.64)	(-0.12)
NOA	-0.0249***	-0.0032	-0.0203***	0.0023
	(-5.85)	(-1.45)	(-7.94)	(1.44)
Size	0.0069**	0.0042**	0.0028	0.0029***
	(2.28)	(2.57)	(1.56)	(2.62)
Tobin's Q	0.0160***	-0.0037	0.0180***	-0.0122***
	(2.78)	(-1.21)	(5.24)	(-5.52)
ROA	-0.1586***	-0.1818***	0.0132	0.1694***
	(-4.94)	(-10.16)	(0.66)	(13.48)
Leverage	-0.0691***	-0.0308***	-0.0419***	0.0079
	(-4.93)	(-3.97)	(-4.93)	(1.54)
Firm_age	0.0069**	0.0019	0.0052***	0.0002
	(2.26)	(1.13)	(2.80)	(0.20)
Intangibles	0.0527***	0.0068	0.0467***	-0.0299***
	(7.35)	(1.64)	(10.71)	(-10.04)
Litigation	0.0016	-0.0028	0.0017	-0.0013
	(0.18)	(-0.61)	(0.30)	(-0.43)
Constant	-0.0227	0.0332**	-0.0591***	0.0215**
	(-0.96)	(2.53)	(-4.05)	(2.57)
Industry and year effects	Yes	Yes	Yes	Yes
N	10,660	10,660	10,660	10,660
R^2	0.1064	0.1145	0.1345	0.1028

Table 6
Location and the choice between REM and AEM

This table presents the results of using heckman selection model to investigate managerial choice between real earnings management and accrual earning management for earnings management suspect firms. Firms are suspects when they have earnings just beat/ meet the prior year's earnings, zero earnings, and analysts consensus forecast. Panel A and B present the results of the first and second stage of Heckman selection model, respectively. In the first stage, we estimate the likelihood of being earnings management suspects using all sample firms. In the second stage, we analyze the association between location and earnings management using suspect firms only. All models control industry and year effects, where industry is defined per Fama and French (1997) 49 industry classifications. Heteroscedasticity robust t-statistics are reported in parentheses. Referred to Appendix A for detailed variable descriptions. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Heckman selection model first stage

	(1) Suspect
Beat	-0.1408***
	(-6.75)
Bonus	0.0292
	(0.12)
Option	0.0521***
	(2.94)
Analyst	0.2622***
	(4.65)
Shares	0.0531*
	(1.75)
ROA	2.2393***
	(6.61)
Leverage	-0.6022***
	(-3.58)
L1.Tobin's Q	0.0403**
	(2.05)
Constant	-2.6213***
	(-17.13)
Year effect	YES
N	9938
R2	0.0403

Panel B. Heckman selection model second stage

	(1)
	$RM_{AGGREGATE}$
URBAN	-0.0243**
	(-2.39)
Delta	0.0140***
	(2.73)
Vega	-0.0119***
	(-2.90)
Tdc1	-0.0090
	(-1.20)
CEO_tenure	-0.0037
	(-0.66)
Per_female_dir	-0.0220
	(-0.38)
Pind	0.0418
	(1.25)
Big 4	0.0123
	(0.78)
Auditor_tenure	-0.0081
	(-1.16)
NOA	-0.0177**
	(-1.99)
Size	0.0164***
	(2.82)
Tobin's Q	0.0000
	(0.00)
Firm_age	0.0085
	(1.18)
Intangibles	0.0865***
	(5.53)
Litigation	0.0379***
	(3.14)
Inverse_Mills	-0.0444*
	(-1.92)
Constant	-0.1052
	(-1.15)
Year effect	YES
N	1831
r2	0.0839

Table 7
Location and earnings management _Alternative measure for urban location

This table presents regression results of tests on location effect on earnings management using alternative definitions for urban firms. We define Metro1 and Metro 2 using the distance to major airports and the number of top 100 cities within 100-mile radiance and employ the sample median as cutoff points. All models control industry and year effects, where industry is defined per Fama and French (1997) 49 industry classifications. Heteroscedasticity robust t-statistics are reported in parentheses. Referred to Appendix A for detailed variable descriptions. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1) $RM_{AGGREGATE}$	(2) RM_{PROD}	(3) RM_{DISX}	(4) DA	(5) $RM_{AGGREGATE}$	(6) RM_{PROD}	(7) RM_{DISX}	(8) DA
Urban1	-0.0085**	-0.0053**	-0.0024	0.0027*				
	(-2.15)	(-2.41)	(-0.98)	(1.86)				
Urban2					-0.0109**	-0.0091***	-0.0027	0.0063***
					(-2.44)	(-3.77)	(-0.98)	(3.92)
Delta	0.0076***	0.0025**	0.0052***	0.0001	0.0077***	0.0026**	0.0053***	0.0000
	(3.84)	(2.24)	(4.27)	(0.13)	(3.91)	(2.34)	(4.29)	(0.03)
Vega	-0.0029*	0.0010	-0.0041***	-0.0015***	-0.0030**	0.0009	-0.0041***	-0.0014***
	(-1.95)	(1.25)	(-4.48)	(-2.86)	(-2.05)	(1.12)	(-4.53)	(-2.74)
Tdc1	-0.0043	-0.0053***	0.0012	-0.0030**	-0.0042	-0.0052***	0.0012	-0.0031**
	(-1.32)	(-2.95)	(0.61)	(-2.48)	(-1.29)	(-2.89)	(0.62)	(-2.57)
CEO_tenure	-0.0009	0.0011	-0.0020	0.0028***	-0.0008	0.0012	-0.0020	0.0027***
	(-0.40)	(0.86)	(-1.39)	(2.98)	(-0.35)	(0.93)	(-1.37)	(2.92)
Per_female_dir	0.0433*	0.0187	0.0143	-0.0118	0.0470**	0.0217	0.0152	-0.0138
	(1.82)	(1.40)	(0.98)	(-1.37)	(1.97)	(1.63)	(1.04)	(-1.61)
Pind	0.0001	0.0022	0.0000	-0.0030	-0.0026	0.0002	-0.0007	-0.0018
	(0.01)	(0.27)	(0.00)	(-0.54)	(-0.17)	(0.03)	(-0.08)	(-0.32)
Analyst	0.0193***	0.0043*	0.0151***	-0.0056***	0.0188***	0.0039	0.0149***	-0.0053***
	(4.40)	(1.81)	(5.63)	(-3.43)	(4.28)	(1.63)	(5.58)	(-3.25)
Beat	-0.0057***	-0.0039***	-0.0019*	-0.0030***	-0.0057***	-0.0039***	-0.0019*	-0.0030***
	(-3.68)	(-4.51)	(-1.94)	(-5.17)	(-3.68)	(-4.51)	(-1.95)	(-5.18)
Big 4	-0.0045	-0.0014	-0.0027	-0.0016	-0.0046	-0.0016	-0.0027	-0.0014
	(-0.65)	(-0.38)	(-0.64)	(-0.60)	(-0.66)	(-0.42)	(-0.64)	(-0.54)
Auditor_tenure	-0.0017	0.0015	-0.0030	-0.0002	-0.0014	0.0016	-0.0029	-0.0003
	(-0.57)	(0.88)	(-1.60)	(-0.18)	(-0.47)	(0.98)	(-1.55)	(-0.24)
NOA	-0.0248***	-0.0032	-0.0203***	0.0023	-0.0248***	-0.0032	-0.0203***	0.0023
	(-5.81)	(-1.42)	(-7.92)	(1.42)	(-5.80)	(-1.42)	(-7.91)	(1.43)
Size	0.0067**	0.0041**	0.0028	0.0029***	0.0067**	0.0041**	0.0028	0.0029***
	(2.22)	(2.51)	(1.52)	(2.68)	(2.23)	(2.53)	(1.52)	(2.64)
Tobin's Q	0.0161***	-0.0037	0.0180***	-0.0122***	0.0160***	-0.0038	0.0180***	-0.0122***
	(2.78)	(-1.20)	(5.23)	(-5.54)	(2.76)	(-1.21)	(5.22)	(-5.52)
ROA	-0.1586***	-0.1818***	0.0133	0.1694***	-0.1583***	-0.1820***	0.0135	0.1698***
	(-4.91)	(-10.10)	(0.67)	(13.46)	(-4.90)	(-10.14)	(0.68)	(13.51)
Leverage	-0.0687***	-0.0305***	-0.0417***	0.0077	-0.0680***	-0.0301***	-0.0415***	0.0075
	(-4.91)	(-3.94)	(-4.92)	(1.50)	(-4.87)	(-3.89)	(-4.90)	(1.46)

Firm_age	0.0075**	0.0023	0.0054***	0.0002	0.0076**	0.0023	0.0054***	0.0001
	(2.47)	(1.32)	(2.94)	(0.15)	(2.48)	(1.37)	(2.95)	(0.08)
Intangibles	0.0524***	0.0065	0.0466***	-0.0297***	0.0515***	0.0061	0.0463***	-0.0296***
	(7.33)	(1.58)	(10.71)	(-9.98)	(7.26)	(1.48)	(10.71)	(-9.95)
Litigation	0.0020	-0.0024	0.0017	-0.0017	0.0009	-0.0034	0.0015	-0.0010
	(0.23)	(-0.52)	(0.31)	(-0.57)	(0.10)	(-0.74)	(0.26)	(-0.33)
Constant	-0.1658***	-0.0292	-0.1450***	0.0198	-0.1649***	-0.0276	-0.1449***	0.0182
	(-4.41)	(-1.35)	(-5.77)	(0.95)	(-4.38)	(-1.24)	(-5.78)	(0.85)
Industry and year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	10,660	10,660	10,660	10,660	10,660	10,660	10,660	10,660
r2	0.1047	0.1130	0.1336	0.1024	0.1049	0.1137	0.1336	0.1034

Table 8
Location and earnings management - Simultaneous equations

This table presents regression results of tests on location effect on earnings management using simultaneous equations allowing real earnings management and accrual earnings management to be determined simultaneously. All models control industry and year effects, where industry is defined per Fama and French (1997) 49 industry classifications. Heteroscedasticity robust t-statistics are reported in parentheses. Referred to Appendix A for detailed variable descriptions. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1) $RM_{AGGREGATE}$	(2) DA
URBAN	-0.0122***	0.0087**
	(-3.01)	(2.38)
Delta	0.0056	
	(0.53)	
Vega	0.0002	0.0033
	(0.00)	(0.23)
Tdc1		-0.0565
		(-1.47)
CEO_tenure		0.0017
		(0.81)
Per_female_dir	0.0376	
	(0.67)	
Pind	-0.0090	0.0250
	(-0.14)	(1.55)
Analyst	0.0179	-0.0041
	(1.22)	(-1.38)
Beat	-0.0060***	0.0008
	(-3.96)	(0.28)
Big 4	-0.0064	0.0022
	(-0.76)	(0.68)
Auditor_tenure	-0.0020	-0.0005
	(-0.67)	(-0.39)
NOA	-0.0245***	0.0020
	(-5.18)	(1.63)
Size	0.0048	0.0235**
	(0.29)	(2.01)
Tobin's Q	0.0158***	-0.0068**
	(3.31)	(-1.97)
ROA	-0.1591***	0.1688***
	(-4.58)	(12.90)
Leverage	-0.0699***	
	(-5.36)	
Firm_age	0.0069	
	(1.30)	
Intangibles	0.0511***	-0.0203***
	(3.48)	(-3.23)
Litigation		-0.0000
		(-0.00)
Constant	-0.0096	0.2603
	(-0.07)	(1.37)
Industry and year effects	Yes	Yes
N	10,660	10,660

Appendix A.

Variables	*Definitions*
Location variables	
URBAN	An indicator variable equals one if a company headquarter is in the metropolitan statistical area of New York City, Los Angeles, Chicago, Washington, San Francisco, Boston, Dallas-Fort Worth, Philadelphia, Houston, or Miami, and zero otherwise
Urban 1	An indicator variable equals one if the minimum distance between a company's headquarter and a major airport is below the sample median, and zero otherwise, where major airports are the large and medium-sized commercial service airport hubs that account for at least 0.25% of total passenger boarding.
Urban 2	An indicator variable equals one if the number of top-100 cities (based on 2010 Census) within 100 miles radiance from a company's headquarter is above the sample median, and zero otherwise
Earnings management variables	
$RM_{AGGREGATE}$	Sum of abnormal production costs and the negative value of abnormal discretionary expenses
RM_{PROD}	The deviations from the predicted values from the following industry-year regression (Abnormal production costs): $\frac{PROD_{it}}{Assets_{i,t-1}} = k_1 \frac{1}{Assets_{i,t-1}} + k_2 \frac{SALES_{i,t}}{Assets_{i,t-1}} + k_3 \frac{\Delta SALES_{i,t}}{Assets_{i,t-1}} + k_4 \frac{\Delta SALES_{i,t-1}}{Assets_{i,t-1}} + \varepsilon_{it}$, where PROD is production costs, defined as the sum of costs of goods sold and change in inventory during the year,
RM_{DISX}	The deviations from the predicted values from the following industry-year regression (Abnormal discretionary expenses): $\frac{DISX_{it}}{Assets_{i,t-1}} = k_1 \frac{1}{Assets_{i,t-1}} + k_2 \frac{SALES_{i,t}}{Assets_{i,t-1}} + \varepsilon_{it}$,
DA	Discretionary accruals calculated using the performance matched method following Kothari et al. (2016).
Delta	The natural logarithm of one plus the dollar change in the CEO's wealth for a 1% change in stock price
Vega	The natural logarithm of one plus the dollar change in the CEO's wealth for a 0.01 change in standard deviation of stock returns
Tdc1	The natural logarithm of one plus CEO total annual compensation
CEO_tenure	The natural logarithm of one plus the years CEO has been served as CEO
Per_female_dir	Total number of female directors scaled by total number of directors on board
Pind	The number of independent directors scaled by the total number of directors on board, where the independent directors are the directors who are not employees of the firm or related to the firms through business relations.
Analyst	The natural logarithm of one plus the number of analysts following the firm
Beat	The number of times the actual earnings per share is larger than the mean analysts forecast
Big 4	An indicator variable with a value of one if the firm's auditor is one of the Big 8, and zero otherwise
Auditor_tenure	The natural logarithm of one plus the number of years the auditor has audited the firm
NOA	Shareholders' equity less cash and marketable securities plus total debt, scaled by total assets for the previous year
Size	Natural logarithm of total assets
Tobin's Q	Total market value of assets scaled by book value of assets
ROA	The ratio of earnings before interest, taxes, depreciation to total assets
Leverage	The sum of current and long-term debt scaled by total assets
Firm_age	The natural logarithm of one plus the number of years the firm appears on CRSP
Intangibles	Research and development and advertising expense scaled by sales
Litigation	An indicator variable with a value of one if a firm's SIC code is 2833–2836, 8731–8734, 7371–7379, 3570–3577, 3600–3674, and zero otherwise
Bonus	CEO annual bonus compensation scaled by annual total compensation
Option	The value of CEO option portfolio estimated from Black-Scholes model scaled by annual total compensation
Shares	The natural logarithm of firm's shares outstanding